

WHAT IS CLAIMED IS:

1. A voltage regulator for controlling an output voltage of an alternator having an armature winding, a field winding and a power supply line, comprising:

a switch means connected in series to the field winding for on/off-control of a field current fed to the field winding;

a flywheel circuit connected in parallel with the field winding for flywheeling the field current to the field winding when the switch means is turned off;

a failure detecting means for detecting a failure in the power supply line connected to an output terminal of the alternator; and

a generation control means for controlling, upon detection of the failure in the power supply line, power generation of the alternator for a predetermined time that is longer than a time constant of the field winding to suppress the power generation.

2. The voltage regulator as in claim 1, wherein the generation control means drives the switch means with a predetermined conductive rate that is smaller than that of the switch means when the failure in the power supply line is detected.

3. The voltage regulator as in claim 1, wherein the generation control means drives the switch means to maintain the output voltage of the alternator to a predetermined voltage that is smaller than a terminal voltage of an on-board battery.

4. The voltage regulator as in claim 1, wherein the generation control means fully turns off the switch means.

5. The voltage regulator as in claim 1, further comprising:  
a rectifier constructed with a Zener diode having a reverse breakdown characteristic,

wherein the failure detecting means detects an output voltage of the armature winding or a DC output voltage of the rectifier, and determines the failure when the detected voltage is larger than a regulated value of the output voltage of the alternator and exceeds a predetermined voltage that is smaller than a reverse breakdown voltage of the Zener diode and continues another predetermined time that is shorter than the time constant of the field winding.

6. The voltage regulator as in claim 1, further comprising:  
an alarm means for issuing an alarm upon detection of the failure in the power supply line.

7. A voltage regulator for controlling an output voltage of an alternator having a field winding, an output terminal connected to a battery through a power supply line, the voltage regulator comprising:

a field current control means connected to the field winding for controlling the field current of the field winding;  
and

an output voltage control means for controlling the field

current control means by detecting at least one of an output voltage of the alternator and a terminal voltage of the battery,

wherein the output voltage control means includes:

a high voltage pulse detecting means for detecting a high voltage pulse that is larger than a predetermined regulated voltage and exceeds a predetermined voltage that is smaller than a withstand voltage of a rectifier provided in the alternator, when it appears at the output terminal of the alternator;

a discriminating means for discriminating a first condition where a single high voltage pulse is generated when an electrical load connected to the power supply line is cut off and a second condition where the high voltage pulse is frequently and repeatedly generated when a connection failure occurs in the power supply line; and

an output control means for suppressing a supply of field current to the field winding only when the second condition is discriminated by the discriminating means.

8. The voltage regulator as in claim 7, wherein the discriminating means includes:

a pulse counting means for counting the number of high voltage pulse signals; and

a pulse duration measuring means for measuring a pulse duration of the high voltage pulses.

9. The voltage regulator as in claim 8, wherein the pulse counting means includes a timer means to operate for a

predetermined time from the input of the high voltage pulse signal in order to discriminate the first and second conditions based on the number of the pulse signals to be inputted during operation of the timer means.

10. The voltage regulator as in claim 9, wherein the pulse duration measuring means accumulates the duration of the high voltage pulse signal when the second condition is discriminated with the pulse counting means to determine the failure only when the accumulated duration exceeds a predetermined value.

11. The voltage regulator as in claim 7, wherein the discriminating means includes a storage means for storing the condition of the high voltage pulse as data and a reset signal generating means for resetting the data stored in the storage means after a predetermined time has passed.

12. A method for controlling power generation of an alternator for a vehicle comprising steps of:

detecting a high voltage pulse that is larger than a predetermined regulated voltage and exceeds a predetermined voltage smaller than a withstand voltage of a rectifier built in the alternator, when the pulse appears at an output terminal of the alternator;

discriminating a first condition where a single high voltage pulse is generated when an electric load connected to a power supply line is cut off and a second condition where the

high voltage pulse is frequently and repeatedly generated when a failure occurs in the power supply line; and

suppressing power generation of the alternator when the second condition is discriminated.

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